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ABSTRACT

This study used survey data to identify college students' dominant learning stages, basing it on Marcia Baxter Magolda's (1992) Epistemological Reflection Model. A total of 699 alumni of a midwestern community college who had completed at least 30 credit hours transferable to baccalaureate degrees elsewhere completed a survey that incorporated three of Baxter Magolda's four dominant learning stages--absolutist, transitional, and independent. The respondents had been last enrolled at the institution 1 or 3 years prior to the survey, and about four-fifths had completed transfers to baccalaureate-granting institutions. Factor analysis indicated that more male than female alumni were further along the continuum of preferred learning stages. Alumni who had first enrolled at the institution at age 24 or older had progressed further on the continuum than had younger alumni. Among men, those at the middle, transitional, stage were less likely to rate the institution as helpful than those at either of the other two stages. Among women, but not men, completion of a bachelor's degree was associated with the dominant learning stage. Five data tables are appended. (Contains 14 references.) (MDM)

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IDENTIFYING DOMINANT STAGE OF INTELLECTUAL DEVELOPMENT: KNOWING AND LEARNING

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This paper was reviewed by the AIR Forum Publications Committee and was judged to be of high quality and of interest to others concerned with the research of higher education. It has therefore been selected to be included in the ERIC Collection of AIR Forum Papers.

Dolores Vura
Editor
AIR Forum Publications

ABSTRACT

How might colleges identify and measure changes in the dominant learning stages of groups of alumni or students? Marcia Baxter Magolda's 1992 Epistemological Reflection Model, a revision of William Perry's 1970 work, identified several stages of intellectual and ethical development at which students might experience difficulty. Baxter Magolda used qualitative research (interviews scored holistically) to gain evidence of individual students' dominant stages. To gain evidence for large groups, this study considers using survey data instead of interviews for groups too large for interviews to be feasible. Data were collected as part of a survey of baccalaureate program alumni at a mid-sized suburban community college. Factor analysis successfully produced equal sized but different loadings for men and women. Dominant learning stage was associated with demographic variables for gender, age and racial ethnic identy, and with several measures of outcomes: perceptions of the helpfulness of general education objectives in mathematics, cumulative GPA, whether alumni had transferred to a four-year degree programs, and whether they had earned bachelor's degrees. Chi-square tests aand analyses of variance were used. This process may provide a "pattern of evidence" useful in assessing learning in general or liberal education and in planning for new or improved curricula.

IDENTIFYING DOMINANT STAGE OF INTELLECTUAL DEVELOPMENT: KNOWING AND LEARNING

Assessment of the effectiveness of general education programs is one of the challenges confronting community colleges, since many general education courses are taken during the first half of students' undergraduate degree programs. Usually general education is intended to provide the "breadth" of education that complements courses that provide "depth" in a major field of study. A variety of approaches to the assessment of general education may be taken. In the spirit of developing "patterns of evidence,"[1] more than one approach might be appropriate. The present approach differs from each of the following three, but might be used in conjunction with any.

(1) Standardized "objective" tests might be like those used for mathematics or English course placement, or they might test broad areas such as humanities and fine arts, natural sciences, or social sciences. If given both early and late in students' careers, they lend themselves to pre-test - post-test designs. However, a problem with them is that faculty members often reject them for not doing justice to the locally developed curriculum that they teach.

(2) Examples of students' performances can be assessed. These examples might be either portfolios especially prepared to demonstrate learning or samples drawn from ordinary course work. Either might be assessed by faculty committees, not to grade students, but to judge program effectiveness. Portfolio evidencecan be assembled to "make a case", but samples of student work are unobtrusive to the students, and so less subject to bias..[2]

(3) Survey questions can ask students if they see themselves as knowing certain skills or kinds of information. However, thinking one knows something is different from actually knowing it. In the negative, if students say they do not know something, and they understand the question being asked, it is likely that they don't.

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[1] See, for example, North Central Association (1997), pp. 29 - 64, for patterns of evidence appropriate to each of the five criteria for accreditation.

[2] An example is described in Jeffrey A. Seybert and Kathleen A. O'Hara (1997), "Development of a Performance-Based Model for Assessment of General Education" in *Assessment Update 9*, issue 4 (July-August), pp. 5 - 7.

The present approach complements other approaches, contributing to a broadened "pattern of evidence." For none of these approaches, can we attribute the learning to either college experiences or to other life experiences.

PURPOSE

Faculty members, counselors, and administrators sometimes express a hope that their students will learn "higher order" abilities to think, to see things from multiple points of view, to see that some approaches are better than others in various contexts, and to take the pluralistic view that there may be more than one excellent approach. They may regret what is perceived as an effect of "schooling"[3] that leads students to think that education is more like accumulating large collections of objective facts than like gaining in the breadth of their understanding of scholarship. Those taking a more pluralistic view sometimes find insightful the idea that students gain understanding of the nature of scholarship as they pass through several stages of intellectual and moral development. If this concern is important at your college, what can count as evidence of success of such education?

The Baxter Magolda theory presupposes that students generally move along through the developmental stages across time, and that students are seldom "purely" at one stage or another. They may be at relatively elementary or advanced stages in different areas of their understanding. Nonetheless, allowing for this type of "messiness", most students are likely, at any one time, to be "mostly" at the most advanced stage they understand. Scales for each stage are needed to measure change within groups over time and to make comparisons between groups.

In-depth interviews with small groups were used to initially identify students' dominant learning stages.[4] The present research is designed to draw similar conclusions using survey techniques in groups too large for interviews to be feasible. So far as learning stage theory can be operationally defined, researchers can use it to produce evidence of changes in students' learning stage. The major purpose of the present paper is to report on progress toward creating survey items that will function as scales for use with large groups to identify respondents'

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[3] The idea was presented as "radical" by Ivan Illych (1970), *Deschooling Society* (New York: Harper and Row).

[4] Baxter Magolda and W. D. Porterfield (1988). *Assessing Intellectual Development: The Link Between Theory and Practice*. Alexandria, VA: American College Personnel Association.

dominant learning stages. A secondary purpose is to illustrate the application of these dominant learning stages by exploring associations of these stages with other variables.

RELATED LITERATURE

Developmental Models. Several examples of developmental models come to mind. Those are associated with Erickson, Piaget, Kohlberg, Perry, and perhaps Chickering. Pascarella and Terenzini (1991)[5] provide a context whereby main features of these models might be compared. The model pioneered by Perry is especially relevant to the present study, because it relates specifically to intellectual and moral development in the college years.

The Perry and Baxter Magolda Models. A leading contemporary theorist in intellectual and moral development is Marcia Baxter Magolda, whose Epistemological Reflection Model (ERM) is most fully described in her 1992 book.[6] The ERM adjusts for gender-related differences in the landmark study by her one-time teacher, William Perry (1970), and focuses on more often encountered lower-level learning stages. Similarly, the present study further restricts itself to the first three stages of Baxter Magolda's four-stage model, focusing on ways of knowing (and so learning) likely to be found among students in the first half of undergraduate bachelor's degree programs, community colleges' baccalaureate-transfer curricula. Although the ERM was developed through qualitative data in the form of individual interviews,[7] the premise of this study is that it is worthwhile to develop appropriate survey methodology needed to apply the model to groups of students too large for individual interviews.

In his classic study, Perry (1970) used nine epistemological positions to analyze the learning experiences of Harvard undergraduates in the 1960s. Characteristic of each position is a different set of presuppositions about the nature of knowledge and scholarship. Data for Perry's work came from interviews with Harvard men seeking counseling and academic assistance. Mary Field Belenky, *et al.* (1986) proposed distinctive "women's ways of

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[5] Ernest Pascarella and Patrick T. Terenzini (1991). *How College Affects Students: Findings and Insights from Twenty Years of Research.* San Francisco: Jossey-Bass. See especially pp. 122-127.

[6] Marcia Baxter Magolda (1992). *Knowing and Reasoning in College: Gender-Related Patterns in Students' Intellectual Development.* (San Francisco: Jossey-Bass).

[7] A scoring system is detailed in Baxter Magolda and Porterfield (1988).

knowing" which prompted Marcia Baxter Magolda, a one-time student of Perry's sympathetic with the idea of distinctive "women's ways," to seek a synthesis. Her model, presented in 1992, has been followed with articles further exploring the extension of her model to what is learned in work-places.[8] All three studies used qualitative evidence obtained interviewing students describing their learning experiences, often their difficulties in learning.

Baxter Magolda's model (1992) provides a continuum along which students begin presupposing that knowledge is a collection of discrete facts, questions with right or wrong answers "out there" waiting to be learned (Absolutist stage). In college they learn that teachers often do not know "the" answers and within this stage progress from thinking there is something wrong with their teachers or themselves to a new view of the nature of knowledge in which they accept that for many questions, there are no "ready made" answers (Transitional stage). Students at the third stage are comfortable with multiple views and interpretations, willing to think independently. Some are at risk of jumping to an unwarranted "naive relativism" thinking that any opinion is as good as any other (Independent stage). Others become ready for the next stage. At the fourth (Contextualist stage), students understand knowledge as the selection or construction of new contexts or theories from within which they can begin to assess various views, and explore ways to integrate them. Baxter Magolda observed that "patterns of knowing that appeared to be gender-related in previous [absolutist, transitional, and independent] ways of knowing seem to converge in the contextual perspective."[9]

Baxter Magolda's ERM presupposes that we can help students move along this continuum. Although some progress might be "natural" due to increased maturity or general learning from life experience, there are opportunities for faculty members and counselors to help students to make the sometimes difficult progression from one stage to the next.[10] Part of the excitement of this theory is that as college staff members better understand the process of epistemological shifts, they will be less inclined to regard these "just happen" and instead take steps to

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[8] See especially her article "Post-College Experiences and Epistemology," *Review of Higher Education* 18 (Fall), pp. 25-44.

[9] Baxter Magolda (1992), p. 57.

[10] See in particular Baxter Magolda and Jennifer Buckley (1997).

better assist their students through the transitions. At a more macro level, institutions might have an additional "pattern of evidence" to use as an indicator that this kind of education is being accomplished.

Analogy with Kuhn's Paradigm Shifts. Insofar as movement along the Baxter Magolda continuum is seen as a progression, it is somewhat analogous, though on an individual level, to the paradigm shifts in science described by Thomas S. Kuhn (1962). Baxter Magolda (and Perry before her) saw students as shifting from one epistemological conception of knowledge to another as they progress from stage to stage, much as scientific communities experience relatively abrupt "revolutions" when one paradigm (of "normal" science) gives way to a new one. In both models, change is somewhat painful and resisted because it involves thinking in new ways about fundamental issues previously thought known or decided. Using evidence from the history of science, Kuhn points out that scientists have tended to retain old theories as long as possible, and have lurched forward only when evidence for new theories is compelling. If scientists find it hard to replace old paradigms with better ones, small wonder that students find it difficult to shift toward more adequate conceptions of what it means to have knowledge.

THE SETTING AND THE SOURCES OF DATA

The study was conducted at a mid-sized, mid-western, suburban community college. The college serves a district which includes several affluent communities of well-educated citizens as well as several other communities with more average distributions of the levels of education and income. Overall, the population in the district has been aging, as is evidenced by comparison of census data from 1980 and 1990. Demographers have pointed out that various minority groups increasingly will be seen in district communities as well as in its community college.

A set of items, designed to reflect the first three of Baxter Magolda's four developmental ways of knowing, were incorporated in the College's 1996 survey of former baccalaureate program students. Conducted by mail, the survey was sent to all alumni who had completed at least 30 semester credits transferable toward baccalaureate degrees elsewhere, and who were last enrolled at the College in either 1994-95 or in 1992-93, one or three years prior to the survey. About four-fifths of the 699 alumni responding to this survey (31 % response rate) had completed transfer to baccalaureate-granting colleges or universities.

The data collected for this study came from three sources: (a) the alumni survey items from which loadings for the preferred and dominant learning stages were derived, (b) several other survey items that elicited alumni sense of satisfaction with the College's help in areas of general education, reports of whether they had transferred to four-year institutions and whether they had completed baccalaureate degree programs, and (c) college data-base information about grade point average and such demographic data as gender, age, and racial ethnic background for cases where respondents did not provide it. A list of the variables used in the study is given in Table 1.

RESEARCH METHODOLOGY AND STRATEGY

This section discusses first the items embedded in the survey instrument, then the statistical factor analysis applied to the survey data and the loadings obtained, and finally, tests of association between the dominant learning stage and available output measures of success.

Building a Scale for Dominant Learning Stage. Items drafted for a scale of learning stages were derived from Baxter Magolda's descriptions of her interviews and her reports of the language students used and, based upon this language, her identifications of dominant learning stages — absolutist, transitional, and independent.[11] Each of the items drafted was intended to elicit the respondents' preferences for one or another of the three learning stages. To conduct a non-threatening interview, one in which students might readily participate, Baxter Magolda asked open-ended questions about students' likes and dislikes about college. Retaining this preferential line of inquiry, the survey question for the present study used the introductory prompt: "What aspects of class do you like or dislike? Please rate your current like or dislike for the following:" On a seven-point Likert-like scale (1 = do not like at all, 7 = like very much), students were asked to rate 18 items, presented in the survey in alphabetical order.

[11] The 18 items embedded in the survey used to develop this new version of the scale included extra possible Absolute stage items, since an earlier version of the scale was short on items that would cluster to reflect the Absolutist stage. For more information, see the paper this researcher presented at the 1996 AIR Forum.

Gender Differences. Since the Baxter Magolda model was designed to reflect gender-related differences, t-tests were performed to determine the extent to which responses differed by gender. None of these stages was expected to be employed exclusively by one gender or the other.[12] Table 2 reports these t-tests. The order for the list of 18 items is by the value of the t-statistic, with women's preferences toward the top and men's toward the bottom of the list. A cursory glance shows that women did seem to rate more highly than men those items that reflected collaboration in learning, while men seemed to rate more highly those items that reflected competitiveness.

Factor Analysis. The second task was to apply factor analysis to various combinations of the 18 specific items to identify a sub-set of items that would load (inter-correlate) so that they could stand empirically as evidence of the three preferred learning stages. Since the ratio of men to women was nearly 1:2,[13] factor analysis was used with distinct data-sets for each gender. The factors obtained from factor analysis were in effect measures, for the individual respondents of the extent to which they preferred various of the three stages.[14] Of the 18 items, one combination of 12 items was found to load with the same four items for each of the three learning stages, and to do so for each gender. The strength of the factors reflects the extent to which students prefer to use various strategies to learn at the various stages. See Table 3 for detailed lists of loadings for each strategy and the stages.

Dominant Learning Stage. The theory implies that individuals will possess some degree of affinity for each of the learning stages, but also will have a dominant preference for one or another at any given time. Over time, these preferences change as students progress along the continuum. Thus, the next step was to operationally define a stage as dominant for an individual. This calculation is simply to determine for each individual, which one of the three factors is greater than either of the other two. To construct the dominant learning stage variable from the loadings is to move from a continuous variable to a class variable. Thus, the variable for dominant learning stage can be used as a discrete, class variable for chi-square and analysis of variance (ANOVA) statistics.

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[12] Baxter Magolda (1992), p. 22.

[13] Responses from 227 men and 452 women included responses to the items related to learning stage.

[14] Factors representing the learning stage variables were standardized in the factor analysis distribution, with means re-scaled to 0 and standard deviations to 1. Individual respondents' scores remained varied.

FINDINGS

Findings are presented in two groups, for input and for output variables. Chi-square and ANOVA statistics were used to test variables for associations and differences among the three dominant learning stages.

Input (Independent) Variables. Except in the case of gender, which was handled in the factor analysis, chi-squares were used to identify associations with as age at entry and racial ethnic majority-minority status. Input variables, other than gender, are reported in Table 4.

Gender. Not only was the factor analysis somewhat different for men and women, the factor analysis showed that, more male alumni were further along the continuum of preferred learning stages than was true for women alumni. The gender data reported in Table 3 show that for men, the proportions of variance explained by the learning stage factors was 25 percent absolutist, 35 percent transitional and 40 percent independent. In the case of women, the corresponding factors were 30 percent absolutist, 41 percent transitional, and 30 percent independent.

Age. Table 4 reports a cross-tabulation of dominant learning stage by the ages of these alumni when they first enrolled at the College. For both genders, the chi squares were sufficient for statistical significance.[15] Among male alumni who entered when they were in the 16-23 age range, 67 percent were in the absolute or transitional stages, while among those first enrolled at age 24 or older, 60 percent had progressed to one of the two more advanced stages, transitional or independent. For women, those who entered while in the traditional 16-23 age range, 74 percent were in the absolutist or transitional stages, while among their older colleagues, 73 percent were at the transitional or independent stages.

Racial-Ethnic Majority or Minority Status. For both men and for women, the standard governmental racial-ethnic minority categories were combined and then contrasted with the majority Caucasian group. Table 4 shows no statistically significant chi-square for dominant learning stage by majority-minority status for women.

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[15] For men, the chi-square = 8.276, df = 2, p = .016. For women, the chi-square = 10.194, df = 2, p = .006.

Among minority males, however, 60 percent preferred the absolute learning stage, 13 percent the transitional stage, and 27 percent the independent stage.[16] This compares with the distribution for majority males of 34 percent absolutist, 34 percent transitional, and 32 percent independent.

Output (Dependent) Variables. Several output variables were investigated, some direct and some indirect output indicators: Table 5 lists the output variables.

Perceived Success of General Education in Mathematics. The survey listed several general education objectives taken from the then-current college catalog and asked respondents to rate on a four-point scale (1 = very little, 4 = very much) their perception of the extent to which the College helped them in those areas of study. For only one was there a statistically significant association with the dominant learning stage, that of men's responses to general education in mathematics. Following this general prompt was a list with one item that read, "Understand and do mathematical operations." Responses were on a 4-point scale (1 = very little, 4 = very much).

Men who had reached the independent stage reported being more helped (mean = 3.01) than did those at the absolute stage (2.76) or the transitional stage (2.53). For women, the means did not differ with statistical significance, but the obtained means also seemed to fluctuate, but with the highest obtained mean being for the transitional stage. These responses suggest that mathematics may have been seen as important for different reasons in the upper and lower dominant stages. Perhaps in both genders, absolute stage alumni perceived mathematics as absolute, and essential for learning "the truth." However, independent thinkers (slightly more men, according to Table 5) might have valued mathematics for its sophisticated principles and highly varied uses. Such alumni would be likely to credit the College with having been very helpful to them.

Cumulative Grade Point Average. An ANOVA was used to determine whether grade point average (GPA) varied with dominant learning stage. For neither men nor women were the obtained differences statistically significant

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[16] This association was statistically significant: chi-square = 8.470, 2 df, p = .014.

(See Table 5). For women, differences were generally in the direction expected — 3.02 absolutist, 3.05 transitional, and 3.07 independent. The GPAs obtained for men were 2.98 at the absolutist stage, 3.07 for transitional alumni, and 3.02 for those at the independent stage.

Transfer. The survey asked alumni whether they had transferred, and if so, where? Respondents could list as many as three institutions, important since community college alumni do move about from one institution to another, especially in metropolitan areas. Flags were set for the respondents (79 %) who reported having transferred to baccalaureate-granting institutions, but, as Table 5 shows, dominant learning stage was not associated with whether or not transferred. For both genders, more alumni who functioned at the Independent level transferred than didn't, but at the absolute stage the reverse seemed to be true.

Completion of a Baccalaureate Degree. An important indicator of success for the transfer curriculum at community colleges is the proportion of its alumni who transfer. Recall that this survey was administered to two groups of alumni, some last enrolled three years prior to the survey, and others one year prior to the survey. It is unlikely that many of the latter group would have completed in only one year, although some have complex patterns of enrollment and do. Many more finish baccalaureate degrees within three years of their last enrollment at a community college. Thus, this measure which includes both is no indication of a graduation rate.

In the case of women alumni, regardless of the last year enrolled, the chi-square test of association between completion of a baccalaureate degree program and dominant learning stage was statistically significant, but for men it was not (Table 5). Women graduates were distributed 42 percent absolutist, 37 percent transitional, and only 20 percent independent. Women who had not yet completed four-year degree programs were 34 percent absolutist, 32 percent transitional, and 34 percent independent. In the case of men (regardless of last year of attendance) the obtained percentages were not statistically significant. Men who reported completion of four-year degrees were 32 percent absolutist, 35 percent transitional, and 33 percent independent. One question this finding raises is whether the fields of learning in which women earn four-year degrees, are fields in which there is more interest in less advanced learning stages.

RESULTS AND CONCLUSIONS

The study identifies the items embedded in the survey and those 12 found through the factor analysis to load with four items for each of the three dominant learning stages, both for men and women, considered separately.

- Separate factor analysis procedures were run for men and women, the two "stacked" for analyses of the entire group. With standardized means and standard deviations, calculations were made of the percentage of variance explained by the three continuous variables for the extent of preference for the various stages. This revealed the *gender* relationship that men were more advanced on the continuum than were women.

- Dominant learning stage was treated as a dependent variable with two demographic variables as independent variables. Tests for association with *age* showed that alumni who first enrolled at the College at age 24 or older had progressed further on the continuum than had alumni in the traditional age group. This was true for both men and women. No differences were associated with *racial-ethnic majority-minority status.*

- Dominant learning stage was also treated as an independent variable and associated with several outcome variables. With respect to success in *general education in mathematics*, women's perceptions did not differ by learning stage. Among men, those at the middle, transitional, stage were less likely to rate the college as helpful than were those at either of the other two stages. Women's *Grade point averages* reflected progression through the continuum, but not by differences large enough for statistical significance. *Success of transfer* was not associated with dominant learning stage. Among women, but not men, *completion of a bachelor's degree* was associated with dominant learning stage.

Identifying dominant learning stage can be useful for both formative and summative assessment. Knowing the dominant learning stage at which students are best or least-well served can help institutions to know where to place increased effort. Comparison of dominant learning stage data at early and late stages of a student's enrollment may provide a measure of change.

IMPLICATIONS FOR INSTITUTIONAL RESEARCH

Preliminary work is here reported on creating a survey-based measure of dominant learning stages, an approach more feasible for large numbers of students than are personal interviews, useful as these are when working with individual students. On several variables, statistics obtained were large enough to confirm implications of the theory, and so provide some element of face validity on the approach.

In several cases, however, test statistics were not statistically significant. Needed are still more items to cut the dominant stages with greater precision, thereby creating a more robust scale with factor loadings greater than those obtained with the present scale. As the scale is improved, reliability tests should also be run.

Assessment of student learning, especially in general education, requires that researchers find ways to measure some of the important kinds of learning outcomes often described as dispositional "seeds" that only become evident years after the formal education has occurred. The present study attempts to develop one such assessment tool.

- Associating developmental learning stage with evidence of perceived success after transfer provides insights about how the first two years might more effectively prepare transfer students for their work after transfer to a baccalaureate degree granting institution.

- Knowing the level of students' learning stage might be honed into a useful formative tool for gaining early evidence of general education, and be useful in planning for new or improved curricula or support services.

Other researchers interested in this topic might wish to join in an effort to develop additional items to improve the robustness of the present scale.[1]

TABLE 1. VARIABLES USED IN THE STUDY

Number of values		Variables
Class	Continuous	
		Independent (Demographic variables)
2		Gender (Survey, augmented from College data base)
2		Age Range (16-23, 24 +) (Survey, augmented from College data base)
2		Racial Ethnic Status (Majority or Minority) (Survey, augmented from College data base)
		Learning Stage
	X	18 specific items expressing preferred learning activity (1 = very little, 7 = very much)
	X	Extent to which individuals registered clustered preferences 3 clusters: absolutist, transitional, independent Standardized scores per factor, mean = 0, st.dev. = 1 (Factors obtained from factor analysis)
3		Dominant Learning Stage 3 stages: absolutist, transitional, independent (Largest of the three factors obtained in factor analysis)
		Output (Dependent Variables)
	X	Extent to which College was seen as helpful in . . . mathematics. (1 = very little, 7 = very much) (From survey item about general education)
	X	Cumulative grade point average (GPA) (A = 4, B = 3, C= 2, D = 1, F = 0) (From the College data base)
2		Transfer (Yes, No) (Survey, augmented from College data base)
2		Completion of a Bachelor's Degree (Yes, No) (Survey)

TABLE 2. RATINGS OF LEARNING STRATEGIES, BY GENDER

Survey Question: "What aspects of class do you like or dislike? Please rate your current like or dislike for the following." (1 = Do not like at all; 7 = Like very much)

Preferences are arranged with women's toward the top and men's toward the bottom. (The total number of respondents ranged from 676 to 690; about 2 women for each man)

N	Learning Strategy	N		MEAN		Difference between means	t
		Men	Women	Men	Women		
1	Read authors with different outlooks	222	445	4.91	5.35	+ 0.44	+ 3.59
2	Listen to other students' points of view	223	445	5.29	5.65	+ 0.36	+ 3.47
3	See how other people do things	223	445	5.35	5.62	+ 0.27	+ 2.71
4	With other students, quiz each other to further learning	222	445	4.51	4.89	+ 0.37	+ 2.65
5	Share own views with other students	223	446	5.35	5.59	+ 0.24	+ 2.27
6	Memorize details	223	445	3.58	3.83	+ 0.25	+ 1.83
7	Study straightforward material with nothing "between the lines"	221	443	4.44	4.66	+ 0.22	+ 1.52
8	Listen, taking in as much information as possible	224	444	5.54	5.66	+ 0.12	+ 1.17
9	Answer exam questions worded the same as material taught.	223	443	5.03	5.17	+ 0.14	+ 1.06
10	Have an instructor who welcomes a variety of ideas	224	441	6.25	6.31	+ 0.07	+ 0.83
11	Decide which ideas to accept and which to reject	220	441	5.39	5.46	+ 0.08	+ 0.76
12	Read and re-read to learn main points for exams	223	445	3.94	4.03	+ 0.09	+ 0.66
13	Be challenged to think for myself	225	446	5.85	5.85	- 0.00	+ 0.01
14	Find ideas that support my views	224	444	5.28	5.27	- 0.00	- 0.02
15	Focus on a particular way of thinking	219	438	4.12	4.10	- 0.02	- 0.14
16	Search for definite answers even if I cannot find them	221	441	4.33	4.28	- 0.04	- 0.34
17	Find that some ideas are better supported than others	223	441	5.39	5.28	- 0.10	- 1.03
18	Debate views	222	444	5.36	5.16	- 0.20	- 1.66

TABLE 3. LOADINGS, ROTATED FACTOR PATTERNS, BY GENDER

(Item numbers are as they appear in Table 2)

MEN				WOMEN			
Item	Factor 1 Indpndnt	Factor 2 Transtnl	Factor 3 Absolute	Item	Factor 1 Transtnl	Factor 2 Indpndnt	Factor 3 Absolute
17	+ .782	+ .184	+ .068	3	+ .790	+ .195	+ .096
14	+ .771	+ .108	+ .190	5	+ .762	+ .276	+ .014
11	+ .678	+ .108	- .018	2	+ .729	+ .189	+ .176
13	+ .633	+ .172	- .257	1	+ .646	+ .231	- .165
5	+ .060	+ .831	+ .031	17	+ .355	+ .650	+ .197
3	+ .120	+ .815	- .090	11	+ .392	+ .645	+ .066
2	+ .276	+ .626	+ .050	14	+ .236	+ .608	+ .427
1	+ .405	+ .465	- .362	13	+ .410	+ .599	- .046
7	- .195	+ .000	+ .642	7	- .009	+ .016	+ .749
9	+ .150	- .273	+ .574	9	- .046	+ .089	+ .712
6	- .007	+ .271	+ .558	15	+ .037	+ .245	+ .578
15	+ .435	- .123	+ .546	6	+ .303	- .440	+ .555
Variance Explained by each factor:							
	2.575	2.212	1.600		2.753	2.033	2.004
Total = 6.377				Total = 6.790			
Percent of Variance Explained by Each factor							
	40 %	35 %	25 %		41 %	30 %	30 %

TABLE 4. DOMINANT LEARNING STAGE BY DEMOGRAPHIC VARIABLES, BY GENDER

VARIABLE	VALUES OF DEMO-GRAPHIC VAR		N	d.f.	Chi-sq	p	
ENTRY AGE GROUP							
	16-23	24 +					
MEN			184	2	8.28	.016	*
Absolutist	37 %	40 %					
Transitional	30 %	55 %					
Indepenent	34 %	5 %					
WOMEN			366	2	10.19	.006	**
Absolutist	42 %	24 %					
Transitional	32 %	38 %					
Indepenent	27 %	37 %					
RACIAL-ETHNIC MAJORITY-MINORITY STATUS							
	Majority	Minority					
MEN			196	2	8.47	.014	*
Absolutist	34 %	60 %					
Transitional	34 %	13 %					
Indepenent	32 %	27 %					
WOMEN			403	2	0.28	.870	ns
Absolutist	36 %	40 %					
Transitional	34 %	33 %					
Independent	30 %	27 %					

TABLE 5. DEPENDENT VARIABLES BY DOMINANT LEARNING STAGE, BY GENDER

VARIABLE	DOMINANT LEARNING STAGE			N	d.f.	Statistic	p
	Absolutist	Transitional	Independent				
HELPFUL ... MATH (Means, 1 = very little, 4 = very much)						F-ratio	
MEN	2.76	2.53	3.01	206	2	4.40	.014 **
WOMEN	2.83	2.87	2.76	408	2	0.49	.612 ns
CUM GPA (Means, A = 4, F = 0)						F-ratio	
MEN	2.98	3.07	3.03	196	2	0.45	.637 ns
WOMEN	3.02	3.05	3.07	403	2	0.17	.840 ns
TRANSFER						Chi-sq	
MEN				212	2	0.44	.801 ns
Yes	35 %	31 %	34 %				
No	38 %	33 %	29 %				
WOMEN				422	2	0.45	.800 ns
Yes	36 %	34 %	30 %				
No	40 %	32 %	28 %				
BACH. DEGREE EARNED						Chi-sq	
MEN				212	2	0.79	.673 ns
Yes	32 %	35 %	33 %				
No	37 %	30 %	33 %				
WOMEN				422	2	8.08	.018 **
Yes	42 %	37 %	20 %				
No	34 %	32 %	34 %				

SELECTED REFERENCES.

Atkin, Eugene (1996, May 8). "Students' Learning Stages and Academic Assessment." Presented to the 36th Annual Forum of the Association for Institutional Research, Albuquerque, NM. Available through ERIC Clearinghouse on Higher Education, ED 397 714.

Babbie, Earl (1983). *The Practice of Social Research*. Belmont, CA: Wadsworth. See especially pp. 437 - 439 for a discussion of factor analysis.

Baxter Magolda, Marcia B. (1992). *Knowing and Reasoning in College: Gender-Related Patterns in Students' Intellectual Development*. San Francisco: Jossey-Bass.

_____ (1994). "Post-College Experiences and Epistemology." *Review of Higher Education 18* (Fall), pp. 25-44.

_____ (1997, November 22). "Pedagogy to Promote Self-Authorship." Presented to the 17th Annual Lilly Conference on College Teaching, Oxford, OH.

Baxter Magolda, Marcia B. and Jennifer Buckley (1997, March). "Constructive-Developmental Pedagogy: Linking Knowledge, Construction and Students' Epistemological Development." Presented to the American Education Research Association, Chicago, IL

Baxter Magolda, Marcia B. and W. D. Porterfield (1988). *Assessing Intellectual Development: The Link Between Theory and Practice*. Alexandria, VA: American College Personnel Association.

Belinky, Mary Field, Blythe McVicker Clinchy, Nancy Rule Goldberger, and Jill Mattuck Tarule (1986). *Women's Ways of Knowing: The Development of Self, Voice, and Mind*. New York: Basic Books.

Illych, Ivan (1970). *Deschooling Society*. (New York: Harper and Row).

Kuhn, Thomas S. (1957). *The Structure of Scientific Revolutions*. Third edition; Chicago: University of Chicago Press, 1996.

North Central Association of Colleges and Schools, Commission on Institutions of Higher Education (1997). *Handbook of Accreditation*. Second ed.; The Association. See especially chapter 4.

Pascarella, Ernest T. and Patrick T. Terenzini (1991). *How College Affects Students: Findings and Insights from Twenty Years of Research*. San Francisco: Jossey-Bass.

Perry, William G. (1970). *Forms of Intellectual and Ethical Development in the College Years: A Scheme*. New York: Holt, Rinehart, and Winston.

SAS Institute. (1989). *SAS/STAT User's Guide, Version 6 edition*. Cary, NC: SAS Institute.